CLAIMS

(1s, 1-22 29/25,41 PCT 4/1/03

1. A method of providing at least part of a diaphragm and at least a part of a back-plate of a condenser microphone with a hydrophobic layer so as to avoid stiction between said diaphragm and said back-plate, said method comprising the steps of

- providing a condenser microphone comprising a diaphragm and a back-plate, wherein an inner surface of said diaphragm forms a capacitor in combination with an inner surface of said back-plate, and

- providing the hydrophobic layer onto the inner surfaces of the diaphragm and the back-plate through a number of openings, said openings being in the back-plate, in the diaphragm and/or between the diaphragm and the back-plate.

2. A method according to claim 1, wherein at least the inner surfaces of the diaphragm and the back-plate are made from a hydrophilic material.

3. A method according to claim 1, wherein the step of providing the hydrophobic layer is performed by providing the hydrophobic layer through a number of openings, the smallest dimension of each of said openings not exceeding 10 μm.

4. A method according to claim 3, wherein the step of providing the hydrophobic layer is performed by providing the hydrophobic layer through a number of openings, the smallest dimension of each of said openings not exceeding 5 μm.

5. A method according to claim 4, wherein the step of providing the hydrophobic layer is performed by providing the hydrophobic layer through a number of openings, the smallest dimension of each of said openings not exceeding 1 μm.

6. A method according to claim 5, wherein the step of providing the hydrophobic layer is performed by providing the hydrophobic layer through a number of openings, the smallest dimension of each of said openings not exceeding 0.5 μm.

7. A method according to claim 1, wherein the static distance between the diaphragm and the back-plate is smaller than 10 μm.

8. A method according to claim 7, wherein the static distance between the diaphragm and the back-plate is smaller than 5 μm.

9. A method according to claim 8, wherein the static distance between the diaphragm and the back-plate is smaller than 1 μm.

10. A method according to claim 9, wherein the static distance between the diaphragm and the back-plate is smaller than 0.5 μm.

11. A method according to claim 10, wherein the static distance between the diaphragm and the back-plate is smaller than 0.3 μm.

12. A method according to claim 1, wherein the step of providing the hydrophobic layer is performed by chemical binding of the hydrophobic layer to poly-silicon, silicon-oxide, silicon nitride and/or silicon-rich silicon nitride surfaces, and forming hydrophobic chains from said hydrophobic layer, said hydrophobic chains pointing away from the surface to which the binding is formed.

13. A method according to claim 1, wherein the step of providing the hydrophobic layer comprises the steps of

- forming a molecule monolayer, and
- cross linking between molecules and multi binding to surfaces

14. A method according to claim 1, wherein the hydrophobic layer base material comprises an alkylsilane.

15. A method according to claim 1, wherein the hydrophobic layer base material comprises a perhaloalkylsilane.

16. A method according to claim 1, further comprising the step of positioning at least part of the diaphragm and at least part of the back-plate in a liquid comprising a liquid phase of the hydrophobic layer base material to be provided on the inner surfaces.

17. A method according to claim 1, further comprising the step of positioning at least part of the diaphragm and at least part of the back-plate in a container comprising a gaseous phase of the hydrophobic layer base material to be provided on the inner surfaces.

18. A method according to claim 1, wherein the hydrophobic layer being provided has a contact angle for water being between 90° and 130°.

19. A method according to claim 18, wherein the hydrophobic layer being provided has a contact angle for water being between 100° and 110°.

20. A method according to claim 1, wherein the hydrophobic layer being provided is stable at temperatures between -40° C and 130° C.

21. A method according to claim 20, wherein the hydrophobic layer being provided is stable at temperatures between -30° C and 110° C.

22. A method according to claim 1, wherein the hydrophobic layer being provided is stable at temperatures up to at least 400° C for at least 5 minutes.

23. A condenser microphone comprising a diaphragm and a back-plate, wherein an inner surface of said diaphragm forms a capacitor in combination with an inner surface of said back-plate, said back-plate and/or said diaphragm is/are provided with a number of openings, and said inner surfaces being provided with a hydrophobic layer, and wherein the static distance between said diaphragm and said back-plate is smaller than 10 μm.

24. A condenser microphone according to claim 23, wherein at least the inner surfaces of the diaphragm and the back-plate are made from a hydrophilic material.

25. A condenser microphone according to claim 23, wherein the smallest dimension of each of the openings does not exceed 10 μm.

26. A condenser microphone according to claim 25, wherein the smallest dimension of each of the openings does not exceed 5 μm.

27. A condenser microphone according to claim 26, wherein the smallest dimension of each of the openings does not exceed 1 μm.

28. A condenser microphone according to claim 27, wherein the smallest dimension of each of the openings does not exceed 0.5 μm.

29. A condenser microphone according to claim 26, wherein the smallest dimension of each of the openings is approximately 3 μm.

30. A condenser microphone according to claim 23, wherein the hydrophobic layer base material comprises an alkylsilane.

31. A condenser microphone according to claim 23, wherein the hydrophobic layer base material comprises a perhaloalkylsilane.

32. A condenser microphone according to claim 23, wherein the static distance between the diaphragm and the back-plate is smaller than 5 μm.

33. A condenser microphone according to claim 32, wherein the static distance between the diaphragm and the back-plate is smaller than 1 μm.

34. A condenser microphone according to claim 33, wherein the static distance between the diaphragm and the back-plate is smaller than 0.5 μm.

35. A condenser microphone according to claim 34, wherein the static distance between the diaphragm and the back-plate is smaller than 0.3 μm.

36. A condenser microphone according to claim 33, wherein the static distance between the diaphragm and the back-plate is approximately 0.9 μm.

37. A condenser microphone according to claim 23, wherein the hydrophobic layer has a contact angle for water being between 90° and 130°.

38. A condenser microphone according to claim 37, wherein the hydrophobic layer has a contact angle for water being between 100° and 110°.

39. A condenser microphone according to claim 23, wherein the hydrophobic layer is stable at temperatures between -40° C and 130° C.

40. A condenser microphone according to claim 39, wherein the hydrophobic layer is stable at temperatures between -30° C and 110° C.

41. A condenser microphone according to claim 23, wherein the hydrophobic layer is stable at temperatures up to at least 400° C for at least 5 minutes.